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A NEW SABRE-TOOTH FROM CALIFORNIA

BY
JOHN C. MERRIAM

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Some years ago Mr. Bernard Bienenfeld of San Francisco very kindly presented to the University of California a collection of fossil mammalian remains containing at least two carnivores which are new to science. One of these has already been described as the type of a new and peculiar canid genus, *Hyaenognathus.** The second form, which is described below, represents a large species of sabre-tooth differing considerably from those previously described.

MACHAERODUS(?) ISCHYRUS, n. sp.

Text, Fig. 1.

The species is known only from a mandible (No. 8140 Univ. Calif. Palae. Col.) found with the type of *Hyaenognathus* near the foot of the Temblor range at Asphalto, Kern County. This specimen, like the others found with it, is covered with a very thin film of gypsum preserving the fragile bone.

The species is characterized by the great reduction of P_3, the presence of a single posterior cusp on P_4, the absence of both metaconid and heel from M_1, the shortness of the diastema, the possession of a prominent flange below the symphysial region, and the abbreviation and general robust character of the jaw.

The age of the beds in which the mandible was found is not definitely determined. Such stratigraphic and palaeontological evidence as has been obtained indicates Quaternary or late Pliocene age. In addition to this, the evidence furnished by the stage of evolution of this species and of the associated *Hyaenognathus* seems to show that they are probably not older than Pliocene.

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*Bull. Dept. Geol. Univ. Calif., Vol. 3, No. 14, p. 278.

The portion of the mandible present represents a large animal, and the species must have been one of the more formidable members of the sabre-tooth group. The jaw is noticeably heavy, while the inferior flange is wider and deeper than in the typical species of *Smilodon* and *Machaerodus* but hardly as prominent as in *Hoplophoneus.* In the symphysial region the inferior portion of the anterior face is concave on either side of the median line, but the whole upper part of this face is strongly convex, and the portion of the alveolar margin occupied by the incisors is bowed far forward. In the region of the cheek teeth the alveolar margins are flared outward rather more than is common in the cats, owing probably to shortness of the jaw.

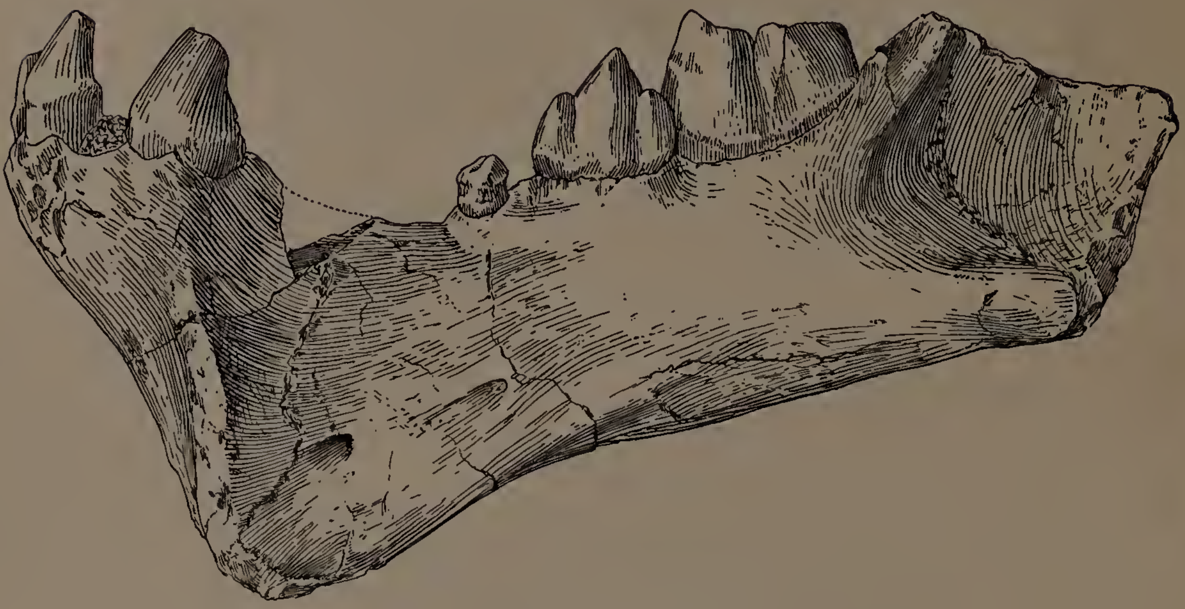

Fig. 1. *Machaerodus* (?) *ischyrus*, n. sp. × ⅔.

The dentition is $\frac{}{3}$, $\frac{}{1}$, $\frac{}{2}$, $\frac{}{1}$. I_3 is absent from both rami, but its alveolus indicates the existence of a tooth approaching the canine in size. I_2 is considerably larger than I_1. P_3 is very small and is single-rooted. P_4 possesses a single large accessory cusp on either side of the protocone, but shows no trace of a posterior basal cusp. The protoconid stands almost erect. In M_1 the protoconid and paraconid are well developed and of nearly equal size. The posterior portion of M_1 is somewhat

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damaged, but there appears to have been neither metaconid nor heel present. The transverse diameter is relatively large and the tooth considerably heavier than in *Smilodon neogaeus.*

Of the North American species *Machaerodus gracilis* Cope, from the Port Kennedy Fissure, resembles the Californian species in the form of P_3, while the heel of M_1 has almost disappeared. *M. ischyrus* differs from this species particularly in the shortness of the diastema and probably of the whole jaw, in the absence of a posterior basal cusp on P_4, and in the complete reduction of the heel of M_1. Judging from Cope's figure* of the type of *M. gracilis* the mandibular flange is not as prominent and the jaw as a whole somewhat weaker than in *M. ischyrus.*

Smilodon fatalis Leidy, from the Quaternary of Texas, known only from the dentition of the upper jaw, if a typical *Smilodon* as it appears to be, would differ in the structure of P_4, as also of the mandible in general.

Dinobastis serus Cope, from the Texas Quaternary, does not differ from *M. ischyrus* greatly in size and had large external incisors with a moderately elongated superior canine. The superior sectorial has a large protostyle, but the basal cusp anterior to this is rudimentary. This means that, as in *Hoplophoneus,* the posterior part of P_4 opposing it was probably relatively shorter than in *Smilodon.* The characters mentioned all suggest correlation with *M. ischyrus,* although there would at present be no justification for considering them identical.

Felis imperialis Leidy, from the Quaternary of Middle California, is known only from a fragment of the upper jaw with the third premolar. It is evidently also a short-faced form but seems to have been, as far as can be determined, of the true *Felis* type.

Machaerodus catocopis Cope, from the Loup Fork of Kansas, has a relatively larger inferior canine, a deeper mandibular flange, and is much narrower across the symphysis.

Machaerodus palaeindicus Bose, from the Siwalik beds of India, very closely resembles this species in size, in shortness of the diastema, and in the form of the anterior portion of the mandible. It appears from the figures* that P_4 has but a single posterior cusp. P_3 is, however, a heavy tooth apparently with two roots and differing much from the corresponding tooth in *M. ischyrus*.

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* E. D. Cope. Jour. Philad. Acad. Nat. Sc., 2nd Ser., Vol. 11, Pl. 20, fig. 1.

Compared with the later machaerodont forms this species is relatively specialized in the reduction of P_3, and the apparent absence of both heel and metaconid from M_1. It is relatively primitive in lacking a second posterior cusp on P_4, and in the prominence of the mandibular flange, which is secondarily reduced in the later sabre-tooths. The abbreviation of the diastema, together with the flare of the alveolar borders, and the robustness of the mandible show that this is a comparatively short-jawed type.

The combination of characters appearing here is peculiar. The stage of development of the mandibular flange suggests an advanced form of *Deinctis*, such as is seen in the John Day *Pogonodon* or in the more primitive *Hoplophoneus* species. The reduction seen in P_3 and in the posterior portion of M_1 equals or exceeds that in *Smilodon* and *Machaerodus*. The character of P_4 is that of *Hoplophoneus* rather than of the later sabre-tooths. As far as can be judged from the characters present, this species could not consistently be referred to any of the three machaerodont groups which it most nearly approaches, viz: *Hoplophoneus, Machaerodus* and *Smilodon*. It may represent a new subgeneric type, in which a peculiar set of conditions suggested by the shortness and strength of the jaw have made possible the combination of primitive and specialized characters seen here. A knowledge of the cranium may bring out definite relationship to one of the known groups, and I therefore refer to the species tentatively under the more or less comprehensive name of *Machaerodus*.

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* R. Lydekker. Paleont. Indica, Ser. 10, Vol. 2, Pl. 43.

MEASUREMENTS.

Length of mandible from anterior side of I_1 to posterior side of M_1	123 mm.
Length of mandible from anterior side of canine to posterior side of M_1	107
Width of anterior face of symphysial region	52
Depth of jaw across the middle of the flange	58
Depth of mandible below posterior end of P_4	36
Length of inferior diastema	33.5
Width of I_1 transversely	4
Width of I_2 transversely	6.5
Antero-posterior diameter of inferior canine	14.5
Antero-posterior diameter of P_3	7
Antero-posterior diameter of P_4	20
Antero-posterior diameter of M_1	28.5
Transverse diameter of M_1	14.5

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